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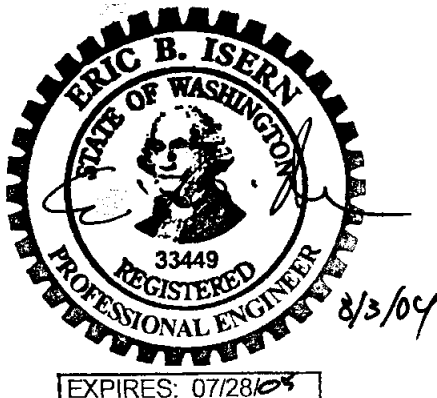
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Notice

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History Sheet

Rev	Date	Reason for revision	Revised by
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1	14 May 2003	Major revision, issued for permitting use	J Medina
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Acronyms and Abbreviations

AEA	<i>Atomic Energy Act</i>
DOE	US Department of Energy
HCP	HLW concentrate receipt process system
HDH	HLW canister decontamination handling system
HEME	high efficiency mist eliminator
HFP	HLW melter feed process system
HLW	high-level waste
HMH	HLW melter handling system
HMP	HLW melter process system
HOP	melter offgas treatment process system
HPH	HLW canister pour handling system
HSH	HLW melter cave support handling system
moly	molybdenum
PT	pretreatment facility
PWD	plant wash and disposal system
RLD	radioactive liquid waste disposal system
SBS	submerged bed scrubber
US	United States
WAC	<i>Washington Administrative Code</i>
WESP	wet electrostatic precipitator

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1 Introduction

The *Washington Administrative Code*, WAC 173-303, requires that secondary containment be designed and operated to contain 100 % of the capacity of the largest tank within its boundary for tank systems containing dangerous waste. This document provides a brief description of the secondary containment sumps, regulated under the Dangerous Waste Permit, in the high-level waste (HLW) vitrification facility. These sumps are listed in Table 1. Floor drains are considered extensions of secondary containment and are listed in Table 2. This document addresses all regulated sumps in the HLW vitrification facility.

2 Applicable Documents

WAC 173-303. *Dangerous Waste Regulations. Washington Administrative Code.*

3 Description

3.1 Sumps Located at Elevation -21 Ft

The sumps shown on the *HLW Vitrification Building General Arrangement (Permit) Plan at El. -21'- 0"*, 24590-HLW-P1-P01T-P0001, Rev 6, are listed in Table 1, numbers 1 through 7. These sumps are equipped with radar-type level detectors and have either ejectors or pumps, as detailed in the following paragraphs. If the sumps are equipped with ejectors, they are either 100 % capacity ejectors or redundant ejectors. 100% capacity ejectors have the ability to remove spills, leaks, or accumulated liquid from the secondary containment system within 24 hours. The sumps, detailed below are dry sumps lined with 6 % molybdenum (6 moly) stainless steel liner material.

3.1.1 Sumps Located in Wet Process Cell

The wet process cell (H-B014) floor area is divided into two sections by the drum transfer tunnel (H-B015); they are the north and south sections.

Two sumps are located in the wet process cell (H-B014):

HCP-SUMP-00001	wet process cell (south)
RLD-SUMP-00001	wet process cell (north)

The following vessels are located in the south section of the wet process cell (H-B014):

RLD-VSL-00007	acidic waste vessel
RLD-VSL-00008	plant wash and drains vessel

If the capacity of the acidic waste vessel (RLD-VSL-00007) is exceeded, the excess overflows to the plant wash and drains vessel (RLD-VSL-00008). Any leakages from these vessels flow into sump HCP-SUMP-00001, which is located in the same cell. This sump is equipped with two 100 % capacity ejectors. During normal operation, one of the ejectors for sump HCP-SUMP-00001 transfers the waste to the plant wash and drains vessel (RLD-VSL-00008). If the capacity of the plant wash and drains vessel (RLD-VSL-00008) is exceeded or failure of the vessel occurs, the excess flows into sump HCP-SUMP-00001. The redundant ejector transfers the waste to breakpot RLD-BRKPT-00004. From this breakpot, the waste flows by gravity to the pretreatment (PT) facility. This sump is located at the -21 ft elevation.

The following vessel is located in the north section of the wet process cell (H-B014):

RLD-VSL-00002	offgas drains collection vessel
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If the capacity of the offgas drains collection vessel (RLD-VSL-00002) is exceeded, the excess overflows to sump RLD-SUMP-00001, which is located in the same section of the cell. Two 100 % capacity ejectors are provided to transfer the waste from the sump to the plant wash and drains vessel (RLD-VSL-00008). This sump is located at the -21 ft elevation.

3.1.2 Sumps Located in Canister Decon Area

The canister decon area is separated into three rooms: the canister rinse tunnel (H-B039B), the canister rinse-bogie maintenance room (H-B039A), and the canister decon cave (H-B035).

Three sumps are located in the canister decon area:

HDH-SUMP-00001
HDH-SUMP-00002
HDH-SUMP-00003

The following vessels are located in this area:

HDH-VSL-00001	rinse tunnel canister rinse vessel
HDH-VSL-00002	canister decon vessel 1
HDH-VSL-00003	waste neutralization vessel
HDH-VSL-00004	canister decon vessel 2

The rinse tunnel canister rinse vessel (HDH-VSL-00001) is located in the canister rinse tunnel (H-B039B) at the -16.5 ft elevation. The waste from this vessel is pumped to the waste neutralization vessel (HDH-VSL-00003). Any leakages from the rinse tunnel canister rinse vessel (HDH-VSL-00001) flow into sump HDH-SUMP-00001 located in this cell. This sump is equipped with one 100 % capacity ejector that transfers the waste to the plant wash and drains vessel (RLD-VSL-00008). This sump is located at the -16.5 ft elevation.

Sump HDH-SUMP-00002 is located in the canister rinse-bogie maintenance room (H-B039A). Any leakage in this tunnel flows into this sump. One 100 % capacity pump located at the sump transfers the

waste to the plant wash and drains vessel (RLD-VSL-00008). From the plant wash and drains vessel (RLD-VSL-00008), the waste is transferred to breakpoint RLD-BRKPT-00007 or RLD-BRKPT-00009. From this breakpoint, the waste flows by gravity to the PT facility. This sump is located at the -16 ft elevation.

Any leakages from the canister decon vessel 1 (HDH-VSL-00002), canister decon vessel 2 (HDH-VSL-00004), and waste neutralization vessel (HDH-VSL-00003) flow into sump HDH-SUMP-00003 in the canister decon cave (H-B035). Canister decon vessels 1 and 2 (HDH-VSL-00002 and HDH-VSL-00004) pass through the floor at the 14 ft elevation. The tops of these vessels protrude approximately 4 ft above the floor. They are supported at the 14 ft elevation. From the floor of the 14 ft elevation, the vessels extend down approximately 14 ft. This room is open to the -16 ft elevation. The overflow from these vessels is transferred to the waste neutralization vessel (HDH-VSL-00003). If the capacity of the waste neutralization vessel (HDH-VSL-00003) is exceeded, the excess overflows into sump HDH-SUMP-00003, which is located in the same cell. This sump is equipped with one 100 % capacity ejector that transfers the waste to the plant wash and drains vessel (RLD-VSL-00008). This sump is located at the -16 ft elevation.

3.1.3 Sumps Located in the SBS Drain Collection Cell No 1

One sump is located in this cell (H-B021):

HOP-SUMP-00003

The following vessel is located in this cell:

HOP-VSL-00903 SBS condensate receiver vessel

Any leakage from the SBS condensate receiver vessel (HOP-VSL-00903) flows into sump HOP-SUMP-00003. This sump also receives waste, through the gravity floor drain from the secondary containment for the melter 1 submerged bed scrubber (SBS) (HOP-SCB-00001), and melter 1 high efficiency mist eliminators (HEMEs) (HOP-HEME-00001A/B). The SBS and HEMEs for melter 1 are located in the west section of melter cave no 1 (H-0117), which is located directly above the SBS drains collection cell no 1 (H-B021). Two 100 % capacity ejectors transfer the waste from sump HOP-SUMP-00003 to the plant wash and drains vessel (RLD-VSL-00008). This sump is located at the -21 ft elevation.

3.1.4 Sumps Located in the SBS Drain Collection Cell No 2

One sump is located in this cell (H-B005):

HOP-SUMP-00008

The following vessel is located in this cell:

HOP-VSL-00904 melter 2 SBS condensate receiver vessel

Any leakage from the melter 2 SBS condensate receiver vessel (HOP-VSL-00904) flows into sump HOP-SUMP-00008. This sump also receives waste, through the gravity floor drain, from the secondary containment for the melter 2 submerged bed scrubber (SBS) (HOP-SCB-00002), and melter 2 high efficiency mist eliminators (HEMEs) (HOP-HEME-00002A/B). The SBS and HEMEs for melter 2 are

located in the west section of melter cave no 2 (H-0106), which is located directly above the SBS drain collection cell no 2 (H-B005). Two 100 % capacity ejectors transfer the waste from sump HOP-SUMP-00008 to the plant wash and drains vessel (RLD-VSL-00008). This sump is located at the -21 ft elevation.

3.2 Sumps Located at Elevation 0 Ft

The sumps shown on the *HLW Vitrification Building General Arrangement (Permit) Plan at El. 0' 0"*, 24590-HLW-P1-P01T-P0002, Rev 3, are listed in Table 1, numbers 8 through 15. These sumps are equipped with either radar-type or bubbler-type level detectors and have either ejectors or pumps as detailed in the following paragraphs. If the sumps are equipped with ejectors, they are either 100 % capacity ejectors or redundant ejectors. 100% capacity ejectors have the ability to remove spills, leaks, or accumulated liquid from the secondary containment system within 24 hours. The sumps detailed below are dry sumps lined with 6 moly stainless steel liner material.

3.2.1 Sumps Located in the Melter Cave No 1 Area

The melter cave no 1 area consists of three rooms: melter cave no 1 (H-0117), melter no 1 equipment decontamination pit (H-0310A), and melter cave no 1 - C3/C5 airlock (H-0116B).

Three sumps are located in the melter cave no 1 area:

HSH-SUMP-00003

HFP-SUMP-00002

HSH-SUMP-00008

Vessels and equipment located in the melter cave no 1 (H-0117) and melter no 1 equipment decontamination pit (H-0310A) include the following:

HMP-MLTR-00001	HLW melter 1
HFP-VSL-00001	melter 1 feed preparation vessel
HFP-VSL-00002	melter 1 feed vessel
HOP-SCB-00001	melter 1 submerged bed scrubber (SBS)
HOP-HEME-00001A	melter 1 high efficiency mist eliminator (HEME)
HOP-HEME-00001B	melter 1 high efficiency mist eliminator (HEME)
HSH-TK-00001	decontamination tank melter cave 1

Sump HSH-SUMP-00003 is located in the central section of melter cave no 1 (H-0117). A 100% capacity ejector in the sump transfers the waste to the plant wash and drains vessel (RLD-VSL-00008). From the plant wash and drains vessel (RLD-VSL-00008), waste is transferred to breakpot RLD-BRKPT-00004. The waste is then transferred to the PT facility by gravity flow into the ultimate overflow vessel (PWD-VSL-00033). This sump is located at the 3 ft elevation.

If the capacity of the melter 1 feed preparation vessel (HFP-VSL-00001) and melter 1 feed vessel (HFP-VSL-00002) is exceeded, the excess overflows to sump HFP-SUMP-00002. Additionally, any leakages from these vessels can flow into the same sump, which is located in the south section of the cell (H-0117). A 100% capacity ejector in the sump transfers waste to the plant wash and drains vessel (RLD-VSL-00008). This sump is located at the 5 ft elevation.

If the capacity of the decontamination tank melter cave 1 (HSH-TK-00001) is exceeded, the excess overflows into sump HSH-SUMP-00008 located in the melter no 1 equipment decontamination pit (H-0310A). A 100% capacity ejector in the sump transfers the waste to the plant wash and drains vessel (RLD-VSL-00008). This sump is located at the 0 ft elevation.

3.2.2 Sumps Located in the Melter Cave No 2 Area

The melter cave no 2 area consists of three rooms: the melter cave no 2 (H-0106), melter no 2 equipment decontamination pit (H-0304A), and melter cave no 2 - C3/C5 airlock (H-0105B).

Three sumps are located in the melter cave no 2 area:

HSH-SUMP-00007

HFP-SUMP-00005

HSH-SUMP-00009

Vessels and equipment located in the melter cave no 2 (H-0106) and melter no 2 equipment decontamination pit (H-0304A) include the following:

HMP-MLTR-00002	HLW melter 2
HFP-VSL-00005	melter 2 feed preparation vessel
HFP-VSL-00006	melter 2 feed vessel
HOP-SCB-00002	melter 2 submerged bed scrubber (SBS)
HOP-HEME-00002A	melter 2 high efficiency mist eliminator (HEME)
HOP-HEME-00002B	melter 2 high efficiency mist eliminator (HEME)
HSH-TK-00002	decontamination tank melter cave 2

Sump HSH-SUMP-00007 is located in the central section of melter cave no 2 (H-0106). A 100% capacity ejector in the sump transfers the waste to the plant wash and drains vessel (RLD-VSL-00008). From the plant wash and drains vessel (RLD-VSL-00008), waste is transferred to breakpot RLD-BRKPT-00004. The waste is then transferred to the PT facility by gravity flow into the ultimate overflow vessel (PWD-VSL-00033). This sump is located at the 3 ft elevation.

If the capacity of the melter 2 feed preparation vessel (HFP-VSL-00005) and melter 2 feed vessel (HFP-VSL-00006) is exceeded, the excess overflows to sump HFP-SUMP-00005. Additionally, any leakage from these vessels can flow into the same sump, which is located in the south section of the cell (H-0106). A 100% capacity ejector in the sump transfers waste to the plant wash and drains vessel (RLD-VSL-00008). This sump is located at the 5 ft elevation.

If the capacity of the waste from decontamination tank melter cave 2 (HSH-TK-00002) is exceeded, the excess overflows into sump HSH-SUMP-00009 located in the melter no 2 equipment decontamination pit (H-0304A). A 100% capacity ejector in the sump transfers the waste to the plant wash and drains vessel (RLD-VSL-00008). This sump is located at the 0 ft elevation.

3.2.3 Sumps Located in Canister Handling Cave

Two sumps are located in the canister handling cave (H-0136):

HPH-SUMP-00001

HPH-SUMP-00005

These sumps collect any liquids or decontamination solutions in the canister-handling cave. A 100% capacity ejector in sump HPH-SUMP-00001 transfers the wastes to the plant wash and drains vessel (RLD-VSL-00008). The contents of sump HPH-SUMP-00005 are transferred by A 100% capacity ejector to the plant wash and drains vessel (RLD-VSL-00008). These sumps are located at the -3 ft elevation.

3.3 Sumps Located at Elevation 14 Ft

There are no regulated sumps at elevation 14 ft.

3.4 Sumps Located at Elevation 37 Ft

The sumps shown on the *HLW Vitrification Building General Arrangement (Permit) Plan at El. 37' 0"*, 24590-HLW-P1-P01T-P0004, Rev 0, are listed in Table 1, numbers 16 through 17. The sump contents flow by gravity into the plant wash and drains vessel (RLD-VSL-00008). The sumps detailed below are lined with 6 moly stainless steel liner material.

3.4.1 Sumps Located in the Active Services Cell Melter No 1

One sump is located in this cell (H-0308):

HFP-SUMP-00001

The following vessel is located in and above this cell:

HOP-WESP-00001 melter 1 wet electrostatic precipitator (WESP)

Any leakage from the melter 1 wet electrostatic precipitator (WESP) (HOP-WESP-00001) can flow into the sump (HFP-SUMP-00001). Additionally if the capacity of the transfer manifold is exceeded, sump HFP-SUMP-00001 receives the overflow. The waste from the sump drains into the plant wash and drains vessel (RLD-VSL-00008). The sump is located in the active services cell melter no 1 (H-0308). This sump is located at the 37 ft elevation.

3.4.2 Sumps Located in Active Services Cell Melter No 2

One sump is located in this cell (H-0302):

HFP-SUMP-00004

The following vessel is located in and above this cell:

HOP-WESP-00002 melter 2 wet electrostatic precipitator (WESP)

Any leakage from the melter 2 WESP (HOP-WESP-00002) can flow into the sump (HFP-SUMP-00004). Additionally if the capacity of the transfer manifold is exceeded, sump HFP-SUMP-0004 receives the overflow. The waste from the sump drains into the plant wash and drains vessel (RLD-VSL-00008). The sump is located in the active services cell melter no 2 (H-0302). This sump is located at the 37 ft elevation.

3.5 Sumps Located at Elevation 58 Ft

There are no regulated sumps at elevation 58 ft.

Table 1 HLW Sumps

Number	Sump PIN	HLW Room Number	Room Name	Elevation (Ft)	Maximum Sump Capacity (US Gal)	Sump Type	Sump Dimensions (In.)	Piping and Instrumentation Diagram Number	Level Detection Type	Material of Fabrication
1	HCP-SUMP-00001	H-B014	wet process cell	-21	70	dry sump	30 in. diam x 18 in. deep	P0015	radar	6 moly
2	RLD-SUMP-00001	H-B014	wet process cell	-21	70	dry sump	30 in. diam x 18 in. deep	P0015	radar	6 moly
3	HDH-SUMP-00001	H-B039B	canister rinse tunnel	-16.5	70	dry sump	30 in. diam x 18 in. deep	P0016	radar	6 moly
4	HDH-SUMP-00002	H-B039A	canister rinse-bogie maintenance room	-16	70	dry sump	30 in. diam x 18 in. deep	P0016	radar	6 moly
5	HDH-SUMP-00003	H-B035	canister decon cave	-16	70	dry sump	30 in. diam x 18 in. deep	P0004	radar	6 moly
6	HOP-SUMP-00003	H-B021	SBS drain collection cell no 1	-21	70	dry sump	30 in. diam x 18 in. deep	P0015	radar	6 moly
7	HOP-SUMP-00008	H-B005	SBS drain collection cell no 2	-21	70	dry sump	30 in. diam x 18 in. deep	P20004	radar	6 moly
8	HSB-SUMP-00003	H-0117	melter cave no 1	3	55.6	dry sump	31.5 in. x 25.5 in. x 16 in. deep	P0008	bubbler	6 moly
9	HFP-SUMP-00002	H-0117	melter cave no 1	5	55.6	dry sump	31.5 in. x 25.5 in. x 16 in. deep	P0008	radar	6 moly
10	HSB-SUMP-00008	H-0310A	melter no 1 equipment decontamination pit	0	55.6	dry sump	31.5 in. x 25.5 in. x 16 in. deep	P0003	radar	6 moly
11	HSB-SUMP-00007	H-0106	melter cave no 2	3	55.6	dry sump	31.5 in. x 25.5 in. x 16 in. deep	P20005	bubbler	6 moly
12	HFP-SUMP-00005	H-0106	melter cave no 2	5	55.6	dry sump	31.5 in. x 25.5 in. x 16 in. deep	P20005	radar	6 moly
13	HSB-SUMP-00009	H-0304A	melter no 2 equipment decontamination pit	0	55.6	dry sump	31.5 in. x 25.5 in. x 16 in. deep	P20003	radar	6 moly
14	HPH-SUMP-00001	H-0136	canister handling cave	-3	70	dry sump	30 in. diam x 18 in. deep	P0016	radar	6 moly
15	HPH-SUMP-00005	H-0136	canister handling cave	-3	70	dry sump	30 in. diam x 18 in. deep	P0004	radar	6 moly
16	HFP-SUMP-00001	H-0308	active services cell melter no 1	37	70	gravity drain	30 in. diam x 18 in. deep	P0015	none	6 moly
17	HFP-SUMP-00004	H-0302	active services cell melter no 2	37	70	gravity drain	30 in. diam x 18 in. deep	P20004	none	6 moly

Table 2 HLW Floor Drains

Number	Drain Line Number	HLW Room Number	Room Name	Maximum Flow Capacity (US Gal/Min)*	Overflow Line Size Pipe Diam (In.)	Piping and Instrumentation Diagram Number 24590-HL W-M6-RLD-	Level Detection Type	Pipe Material of Fabrication
1	RLD-ZF-00330-S11B-03	H-B021	SBS drain collection cell no 1	20	3	P0015	NA	316L Stainless Steel
2	RLD-ZF-03447-S11B-03	H-B005	SBS drain collection cell no 2	20	3	P20004	NA	316L Stainless Steel

* Note: The basis for obtaining maximum flow capacity US gal/min is $d=0.92q^{0.4}$ where d = overflow line diameter in inches and q = flow rate in gal/min.